

CLAIMS:

1. A method for detecting an object using a capacitive sensor output signal, comprising:
 - (a) measuring an output from the capacitive sensor at spaced apart intervals to obtain a sequence of output values;
 - (b) comparing the sequence of sensor output values with comparison data indicative of an ideal sensor output sequence; and
 - (c) determining that an object has been detected where a match is obtained between the sequence of output values and the comparison data.
2. The method of claim 1 wherein the sequence of sensor output values are stored in a buffer, and the method further comprises:
 - (d) measuring a next output value from the capacitive sensor;
 - (e) deleting a sensor output value according to a FIFO scheme;
 - (f) adding the next sensor output value to the sequence of sensor output values;
 - (g) comparing the sequence of sensor output values with the predetermined comparison data;
 - (h) repeating (d) to (g) until an object is detected.
3. The method of claim 1 or 2 wherein said comparing includes obtaining an error value between the sensor output values and the comparison data and determining that a match has been obtained where the error value is less than a threshold value.
4. The method of claim 3 wherein the threshold value corresponds to a predetermined measure of acceptable error between the actual data and the ideal data.
5. The method according to any preceding claim wherein the intervals correspond to the sensor moving a predetermined distance.
6. The method of any preceding claim wherein the capacitive sensor output is measured at spaced apart intervals using a triggering pulse.

7. The method of claim 6 wherein the triggering pulse is obtained from a speed sensor measuring distance moved by the capacitive sensor.
8. The method of any preceding claim wherein the comparison data values relate to an object having a height equal to or greater than a height at which the sensor is positioned, and at intervals in which the sensor moves a predetermined distance.
9. The method of any preceding claim wherein the comparison data is stored in a look-up table.
10. The method of any one of claims 1 to 8 wherein the comparison data is obtained by calculating an ideal output for a particular change in distance.
11. The method of claim 1, wherein once an object has been detected, the method comprises:
 - measuring the output from the capacitive sensor at spaced apart intervals;
 - comparing a measured output value with a corresponding comparison data value indicative of an ideal sensor output to determine if the measured output value differs from the comparison data value; and
 - determining a moderated output value, such that the moderated output value corresponds to the measured output value except where the comparison shows the measured output value to differ from the corresponding comparison data value, wherein the moderated output value is adjusted to reduce the difference from the comparison data value.
12. The method according to any preceding claim, wherein the capacitive sensor is used in relation to a vehicle.
13. A vehicle sensor device comprising:
 - means for measuring an output from the capacitive sensor at spaced apart intervals to obtain a sequence of output values;
 - data storage means comprising comparison data indicative of an ideal sensor output sequence;

comparator for comparing the sequence of sensor output values with predetermined comparison data indicative of an ideal sensor output sequence; and means for determining that an object has been detected where a match is obtained between the sequence of output values and the comparison data.

14. The device of claim 13 wherein the data storage means is a look up table.

15. The device of claim 13 or 14 further comprising a triggering means for generating a triggering pulse to indicate the spaced apart intervals.

16. The device of claim 15 wherein the triggering means is a speed sensor measuring distance moved by the capacitive sensor.

17. The device of any one of claims 13 to 16 further comprising a circular buffer for storing the sequence of measured sensor output values.

18. A method of regulating a controller in a capacitive sensor system, the controller having a controller reference, the method comprising:

measuring output values from the capacitive sensor at spaced apart intervals;
periodically determining whether a comparison value, indicative of the measured output, differs from the controller reference; and

determining whether to update the controller reference based upon the difference between the comparison value and the controller reference.

19. The method of claim 18 further comprising:
determining whether the system is in motion; and

(i) where the system is not in motion and the comparison value differs from the controller reference, the controller reference is updated so as to reduce the difference between the comparison value and the controller reference; or

(ii) where the system is in motion:
examining a sequence of output values to determine if an object is detected, and if an object has not been detected and the comparison value differs from the controller

reference, updating the controller reference so as to reduce the difference between the comparison value and the controller reference.

20. The method of claim 19 wherein an object is detected when the sequence of output values is increasing.

21. The method of any one of claims 18 to 20 wherein the comparison value is calculated by:

filtering spurious values from a sequence of measured sensor output values; and averaging the sequence of measured sensor output values to obtain the comparison value.

22. The method of claim 19 or 20 wherein controller reference is updated with the last value in the sequence of filtered output values.

23. The method of any one of claims 18 to 21 wherein the controller reference is updated by one or more increments or decrements.

24. An apparatus for regulating a controller of a capacitive sensor system comprising:

means for measuring output values from the capacitive sensor at spaced apart intervals;

data storage means for storing a controller reference;

periodically determining whether a comparison value, indicative of the measured output, differs from the controller reference; and

comparator for determining whether a comparison value, indicative of the measured output, differs from the controller reference; and

means for determining whether to update the controller reference based upon the difference between the comparison value and the controller reference.

25. The vehicle sensor device of claim 24 wherein the comparator further comprises:

a filter for filtering spurious values from the measured output values; and

second storage means for storing a sequence of measured output values; and means for averaging the sequence of measured output values to obtain a comparison value, wherein the comparison value is compared with the controller reference.

26. The device of claim 25 wherein the second storage means is a circular buffer.
27. A method for moderating an output from a capacitive sensor system comprising:
measuring the output from the capacitive sensor at spaced apart intervals;
comparing a measured output value with a corresponding comparison data value indicative of an ideal sensor output to determine if the measured output value differs from the comparison data value; and
determining a moderated output value, such that the moderated output value corresponds to the measured output value except where the comparison shows the measured output value to differ from the corresponding comparison data value, wherein the moderated output value is adjusted to reduce the difference from the comparison data value.
28. The method of claim 27 wherein the moderated output value corresponds to comparison data value when the comparison shows the measured output value to be lower than the comparison data value.
29. The method of claim 27 or 28 wherein the output data is only moderated once an object is detected.
30. The method of any one of claims 27 to 29 wherein each of the sensor output values measured at spaced apart intervals are sequentially compared with a corresponding comparison data value.
31. The method of any one of claims 27 to 30 wherein the comparison data is obtained by calculating an ideal output for a particular change in distance.
32. A vehicle proximity sensor system comprising:

means for measuring an output from the capacitive sensor at spaced apart intervals;

data storage means comprising comparison data indicative of an ideal sensor output;

comparator for comparing a measured output value with a corresponding comparison data value indicative of an ideal sensor output to determine if the measured sensor output value differs from the comparison value by a predetermined amount; and

means for determining a moderated output value, such that the moderated output value corresponds to the measured output value except where the comparison shows the measured output value to differ from the corresponding comparison data value, wherein the moderated output value is adjusted to reduce the difference from the comparison data value.

33. A system as claimed in claim 32 further comprising an output means for outputting the moderated output value to a warning device in order to generate an appropriate warning signal based upon the value of the moderated output.

34. A vehicle sensor device substantially as herein described with reference to the accompanying drawings.

35. A method of operating a capacitive sensor substantially as herein described with reference to the accompanying drawings.